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THE SECRETARY OF THE INTERIOR

WASHINGTON

July 5, 1984

The Honorable Donald P. Hodel
Secretary of Energy
Washington, D.C. 20585

Dear Mr. Secretary:

The Compact of Free Association, which the President transmitted to the Congress on March 30, 1984, will provide the means of terminating the United States' trusteeship in the Marshall Islands. In the short time that remains before the termination of the Trusteeship, we are eager to learn your views on the possibilities for the resettlement of the people of Bikini in their home atoll. As you know, the resettlement of Bikini in the 1970's was aborted in August 1978 after monitoring by the Department of Energy revealed higher-than-expected body burdens of Cesium 137. The high counts were seen as resulting from the consumption of foods grown on Bikini. Eneu Island, within Bikini Atoll, was then considered as a relocation site for the community, but on the advice of the Department of Energy, the Department of the Interior decided not to permit a resettlement of Eneu in 1979.

We would like to determine whether we can permit the Bikinians to return to Eneu before the trusteeship ends. When the Congress approves the Compact of Free Association, the Republic of the Marshall Islands will have a full measure of self-government, and will be responsible for decisions regarding a return to Bikini. Recognizing our trust responsibilities, however, we would like to again consider the acceptability of Eneu for resettlement at this time and, if we cannot now support such resettlement, to provide to the Marshall Islands Government the requisite information for its future management of this issue.

The Department of Energy studied the question of relocation to Eneu and set out its findings in a letter dated May 15, 1979, from Assistant Secretary for Environment Ruth C. Clusen (copy enclosed). We would expect, however, that in the five years, some of the uncertainties which then existed might have been resolved, and that at least some improvement might have occurred both in our knowledge and in the conditions which led to earlier recommendations.

HARRY BROWN'S Files, NV
Eneu Resettlement FY 1986
General Correspondence

It seems likely also that the Bikinians are somewhat more knowledgeable in administrative controls. We believe it is pertinent to note our experience in Rongelap Atoll where we have good evidence, confirmed by DOE's bio-assay program, that diet restrictions are being adhered to.

We would appreciate your advice in these matters and ask you to update the Department of Energy's evaluation and inform us what conditions, if any, should be imposed if the people of Bikini are relocated to Eneu Island in their home atoll.

Sincerely,

William Clark

Enclosure

Defense Programs

MAY 20 1985

Honorable Donald Paul Hodel
Secretary of the Interior
Washington, DC 20240

Dear Mr. Secretary:

In response to letter of July 5, 1984 from the former Secretary of Interior, William Clark, I am pleased to provide the Department's update of its 1979 evaluation of the habitability of Eneu Island in Bikini Atoll and to advise what conditions, if any, should be imposed upon a populati which might resettle on that island.

A decision as to the acceptability of the risks from exposure to radiation on Eneu Island is a complex matter. A number of factors, including the social costs to the Bikini people of not having access to their homeland, are appropriate for consideration.

Based upon our evaluation of the radiological conditions at Bikini, can be concluded that if imported food can be substituted for a major fraction of local coconut product intake, the average exposure to the population on Eneu would be consistent with current radiation protection guidance. Unless imported food replaces a substantial portion of the locally grown coconut in the diet, however, the recommended radiation exposure limits would be exceeded. Actual doses to individuals will, of course, depend in large measure on their dietary habits and may, for some individuals, exceed current radiation protection limits.

Conditions that could be imposed to reduce exposures and risk of a population resettling Eneu Island include:

1. Imported foods should constitute a substantial fraction of the Eneu diet for at least the next 15 to 20 years.

2. Residence on Bikini Island and consumption of terrestrial foods, including coconut tree sap grown on Bikini Island, should be prohibited.

3. At least for several years following any resettlement, a program should be maintained to monitor the actual radiological situation.

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Enclosed herewith is a more detailed discussion of this matter prepared by my staff.

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If you require additional information, please let me know. Should you decide to authorize or facilitate an Eneu resettlement, we would be pleased to assist in your ~~determined~~ planning~~ and implementation~~.

Yours truly,

Original Letter
Signed By

John S. Herrington

Enclosure

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DISCUSSION PAPER

Radiological Implications of the Resettlement of Eneu Island, Bikini Atoll

The most recent information regarding doses and health risks on Bikini Atoll is contained in the Marshallese/English book entitled "The Meaning of Radiation at Bikini Atoll" which was published in September 1980. A copy is enclosed. Full-time residence on Eneu is discussed on page 21 for two alternative cases: (a) with imported foods available, and (b) with only Eneu-grown foods available. The expected doses and their predicted consequences are tabulated. These estimates assumed resettlement in 1980. They have been updated in the following discussion by applying a reduction of 11 percent to account for radiological decay between 1980 and 1986. Assuming that imported foods constitute approximately one-half of the daily intake (case a), the dose rate to a population resettled on Eneu in 1986 would reach a maximum of approximately 115 one-thousandth parts of roentgens equivalent in man (mrem) per year in 1989 and decline thereafter at a rate of some 2 percent per year. In the maximum year 70 percent of the population would experience dose rates below 115 mrem per year. Approximately 1 or 2 percent of the population might experience dose rates exceeding 350 mrem per year during this maximum.

The population dose rate will continuously diminish over the years following resettlement and, over a 30-year period, will average approximately 90 mrem per year. At any given time, 70 percent of the population will be experiencing exposures below the average, while 1 or 2 percent may be experiencing exposures at a rate of three times the average or higher. However, these above-average exposures will be randomly distributed in the population and in time, and are included in the 90 mrem per year population average. The most probable cumulative dose for the average individual over the 30-year period will be about 3 rem (3000 mrem).

It is estimated that the number of cancer deaths that might be attributable to these exposures in a population of 550 might number between three tenths and one. In the same population 24 cancer deaths would be expected to occur from causes other than radiation.

The above estimates of dose and health consequences would be approximately doubled if only Eneu-grown terrestrial foods were consumed and substantially more than doubled if a significant fraction of the diet were derived from foods grown on Bikini Island.

General guidance exists for limiting radiation exposure from manmade sources. The Federal Radiation Council in 1960 recommended 500 mrem per year for an individual, 170 mrem per year as an average for population groups, and a cumulative dose limit of 5,000 mrem over a 30-year period. The Federal Radiation Council stated in 1960 that these standards might be exceeded if the reason for doing so were carefully considered.

Recently both the International Commission on Radiation Protection and the United States National Council on Radiation Protection and Measurements have reviewed the issue of radiation protection standards. Both groups have concluded that: (1) the limit of 500 mrem per year whole body dose equivalent, not including medical and natural background radiation, is still recommended for individuals when the exposure is not continuous, and (2) the recommended limit for continuous exposure of an individual in the population is 100 mrem per year whole body dose equivalent, not including exposure from natural background and medical procedures. This limit for continuous life-time exposure is associated with a life-time risk of cancer of one in a thousand. The Environmental Protection Agency, which develops standards and provides advice to Federal agencies, endorsed these recommendations in recent rulings establishing national emission standards for radionuclides.

A decision as to the acceptability of the above-described risks from exposure to radiation on Eneu Island is a complex matter. A number of factors, including the social costs to the Bikini people of not having access to their homeland, are appropriate for consideration.

Based upon our evaluation of the radiological conditions at Bikini, it can be concluded that, if imported food can be substituted for a major fraction of local coconut product intake for at least the next 15 to 20 years, the average exposure to the population resettled on Eneu would be consistent with current radiation protection guidance. Unless imported food replaces a substantial portion of the locally grown coconut in the diet, however, the recommended radiation exposure limits would be exceeded. Actual doses to individuals will, of course, depend in large measure on their dietary habits and may, for a small number of individuals under certain circumstances, exceed recommended radiation protection limits.

Conditions that could be imposed to reduce exposures and risk of a population resettling Eneu Island include:

1. Imported foods should constitute a substantial fraction of the Eneu diet. Our experience in recent years and our observations at Rongelap, Utirik, and more recently at Enewetak, indicate a distinct preference for a mix including imported foods over an exclusively locally produced diet. This apparent preference should be reinforced by authoritative dietary recommendations and by assuring that regular field trip service or some other dependable source of imported foods is maintained.

2. Residence on Bikini Island and consumption of terrestrial foods, including coconut tree sap grown on Bikini Island, should be prohibited.

   While some Eneu residents, notwithstanding these recommendations, may visit Bikini and partake of some Bikini local foods, the population must be informed of the risks associated with such practices. Brief visits to Bikini Island, especially if Bikini foods are not eaten, will not appreciably change the dose prediction, but, if visits are extended and include consumption of local foods, the doses will rise rapidly. For example, if 50 percent of the diet were to come from Bikini Island, the average annual dose would be in excess of 500 mrem.

3. At least for several years following any resettlement, a program should be maintained to monitor the actual radiological situation.

Department of Energy
Washington, DC
May 13, 1985

EVALUATION OF ENEWETAK RADIOACTIVITY CONTAINMENT

Committee on Evaluation of Enewetak
Radioactivity Containment
Advisory Board on the Built Environment
Commission on Sociotechnical Systems
National Research Council

NATIONAL ACADEMY PRESS
Washington, D.C.
1982

NOTICE: The project that is the subject of this report was approved by the Governing Board of the National Research Council, whose members are drawn from the Councils of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. The members of the committee responsible for the report were chosen for their special competences and with regard for appropriate balance.

This report has been reviewed by a group other than the authors according to procedures approved by a Report Review Committee consisting of members of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine.

THE NATIONAL RESEARCH COUNCIL was established by the National Academy of Sciences in 1916 to associate the broad community of science and technology with the Academy's purpose of furthering knowledge and of advising the federal government. The Council operates in accordance with general policies determined by the Academy under the authority of its Congressional charter of 1863, which establishes the Academy as a private, nonprofit, self-governing membership corporation. The Council has become the principal operating agency of both the National Academy of Sciences and the National Academy of Engineering in the conduct of their services to the government, the public, and the scientific and engineering communities. It is administered jointly by both Academies and the Institute of Medicine. The National Academy of Engineering and the Institute of Medicine were established in 1964 and 1970, respectively, under the charter of the National Academy of Sciences.

THE COMMISSION ON SOCIOTECHNICAL SYSTEMS is one of the major components of the National Research Council and has general responsibility for the cognizance over those program areas concerned with physical, technological, and industrial systems that are or may be deployed in the public or private sector to serve societal needs.

THE ADVISORY BOARD ON THE BUILT ENVIRONMENT is that unit of the Commission on Sociotechnical Systems which focuses on those scientific and technological issues that are critical to the improvement of national policies and programs for the built environment.

This report was prepared under contract number DNA002-80-C-0011 between the National Academy of Sciences and the Defense Nuclear Agency.

For information regarding this document, write the Executive Director, Advisory Board on the Built Environment, National Research Council, 2101 Constitution Avenue, N.W., Washington, D.C. 20418.

Chapter 1
SUMMARY AND CONCLUSIONS

In conducting its assessment of the effectiveness of the Cactus Crater structure in preventing harmful amounts of radioactivity from becoming available for internal or external human exposure, the Committee on Evaluation of Enewetak Radioactivity Containment organized a drilling program to obtain cores through the entire depth of the finished containment structure, visited Enewetak Atoll to examine the structure and observe the drilling operation, reviewed all relevant data and reports connected with the cleanup program, and interviewed key individuals associated with the program, including those responsible for radiation measurements and their interpretation. During its deliberations, the committee focused on such issues as the nature of the radioactive materials contained within the structure, the possible changes that might occur to the structure as time passes, the ways in which radioactive material now contained in the structure conceivably might be transported elsewhere, and the radioactive risks to which the people of Enewetak would be exposed in the most extreme of these hypothetical cases.

1.1 The Containment Structure

The committee believes that the Cactus Crater containment structure and its contents present no credible health hazard to the people of Enewetak, either now or in the future.

The function of the containment structure, as the committee perceives it, is to prevent hazardous human exposure to the radioactive material buried within it, and the committee believes it is highly unlikely that any sequence of events would prevent the structure from performing this function. Any flushing or spilling of the contents of the structure into the lagoon or ocean that might occur as a result of cracking, settlement, or storm damage will not create an unacceptable radioactive hazard. Indeed, even if the entire radioactive contents of the containment structure were to find its way into the lagoon, no unacceptable hazard would result.

Although no significant radioactive hazard would be created if the containment structure were to fail in any way, it is prudent to maintain the physical integrity of the structure in order that it may continue to prevent direct human access to the radioactive material it contains. Thus, inspection of the dome should take place periodically

and after severe storms. Cracking or settling of the panels should not be of concern, but breaches in the riprap should be repaired to provide protection against wave action during storms.

1.2 Related Issues

The committee was asked that its assessment of the Cactus Crater structure be "set against an understanding of the expected living patterns of the people of Enewetak in terms of their degree of contact with Runit Island and their exposure otherwise to residual radioactivity on the atoll." In this regard the committee makes two comments.

1.2.1 Runit Island

There is a hazard of uncertain magnitude on Runit Island because of the possible presence of plutonium not located and removed during the cleanup (a situation unique to Runit), and, for this reason, Runit has been made off-limits, a status the committee does not dispute. It is likely, however, that the people of Enewetak and others believe Runit to be off-limits because of hazards associated with the containment structure. The committee therefore emphasizes that its conclusion regarding the safety of the structure should not be interpreted to mean that Runit is thought to be harmless. It may well be that an important future function of the containment structure will be to serve as a reminder to everyone that the island is to be avoided in view of the possible presence of plutonium there.

1.2.2 Enjebi Island

It is likely that the Dri-Enjebi sooner or later will resettle their home islands in the northern part of the atoll. Radiation exposures associated with such a move far exceed any exposures that can be associated with the dome or with the radioactivity remaining in the lagoon. Indeed, for people who might live on Enjebi in the near future, radiation exposures due to strontium-90 or cesium-137 in locally grown foods may become excessive in relation to current U.S. standards for a general population, especially if food is not imported from other islands of the atoll or from outside.